

CLAIMS

What is claimed is:

- 1 1. An imaging system comprising an image sensor, a memory, and a processor, wherein:
2 the image sensor is configured to generate image signals corresponding to an image of a scene;
3 the memory is configured to store image data corresponding to the image signals; and
4 the processor is configured to control operations of the imaging system in a diagnostic mode and in a
5 normal operating mode, wherein, during the diagnostic mode, the processor analyzes the image data to
6 determine if the image sensor is defective.

- 1 2. The invention of claim 1, wherein:
2 the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a
3 single integrated circuit; and
4 the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

- 1 3. The invention of claim 1, wherein the diagnostic mode enables the imaging system to be tested using
2 a testing system, wherein:
3 the processor generates instructions for controlling test operations of the testing system;
4 the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
5 the processor generates test results based on the image data indicating whether the image sensor is
6 defective.

- 1 4. The invention of claim 3, wherein the test results are stored in the imaging system for access by the
2 processor during the normal operating mode.

- 1 5. The invention of claim 3, wherein the test results identify a set of one or more defective pixels in the
2 image sensor.

- 1 6. The invention of claim 3, wherein the imaging system is configured to use the test results during the
2 normal operating mode to compensate for one or more defective pixels identified during the diagnostic mode.

- 1 7. The invention of claim 3, wherein the testing system is configured to test a packaged image sensor.

- 1 8. A method for fabricating an imaging system comprising the steps of:
2 (a) forming an image sensor configured to generate image signals corresponding to an image of a scene;
3 (b) forming a memory configured to store image data corresponding to the image signals; and

1 (c) forming a processor configured to control operations of the imaging system in a diagnostic mode and
2 in a normal operating mode, wherein, during the diagnostic mode, the processor analyzes the image data to
3 determine if the image sensor is defective.

1 9. The invention of claim 8, wherein:
2 the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a
3 single integrated circuit; and
4 the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

1 10. The invention of claim 8, wherein the diagnostic mode enables the imaging system to be tested using
2 a testing system, wherein:
3 the processor generates instructions for controlling test operations of the testing system;
4 the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
5 the processor generates test results based on the image data indicating whether the image sensor is
6 defective.

1 11. The invention of claim 10, wherein the test results are stored in the imaging system for access by the
2 processor during the normal operating mode.

1 12. The invention of claim 10, wherein the test results identify a set of one or more defective pixels in the
2 image sensor.

1 13. The invention of claim 10, wherein the imaging system is configured to use the test results during the
2 normal operating mode to compensate for one or more defective pixels identified during the diagnostic mode.

1 14. The invention of claim 10, wherein the testing system is configured to test a packaged image sensor.

1 15. An imaging system comprising an image sensor, a memory, and a processor, wherein:
2 the image sensor is configured to generate image signals corresponding to an image of a scene;
3 the memory is configured to store image data corresponding the image signals; and
4 the processor is configured to control operations of the imaging system in a normal operating mode,
5 wherein, during the normal operating mode, the processor processes the image data to compensate for one or
6 more defective pixels in the image sensor.

1 16. The invention of claim 15, wherein:

the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a single integrated circuit; and

the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

17. The invention of claim 15, wherein the processor is further configured to control operations of the imaging system in a diagnostic mode, wherein, during the diagnostic mode, the processor analyzes the image data to identify the one or more defective pixels in the image sensor.

18. The invention of claim 17, wherein the diagnostic mode enables the imaging system to be tested using a testing system, wherein:

- the processor generates instructions for controlling test operations of the testing system;
- the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
- the processor generates test results based on the image data indicating whether the image sensor is defective.

19. The invention of claim 18, wherein the test results are stored in the imaging system for access by the processor during the normal operating mode.

20. The invention of claim 18, wherein the testing system is configured to test a packaged image sensor.